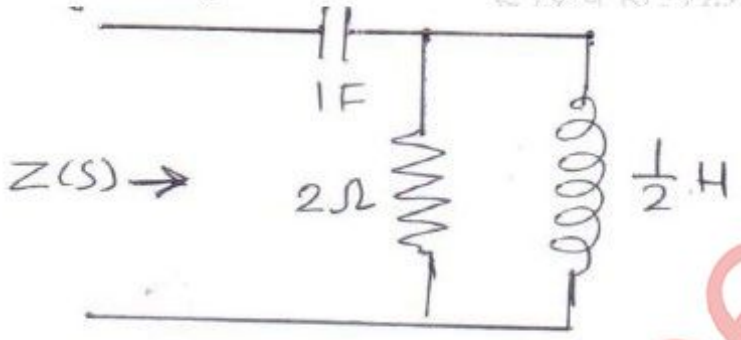
Q. P. Code : 13675

REVISED COURSE

(03 Hours) **Total Marks: 80**

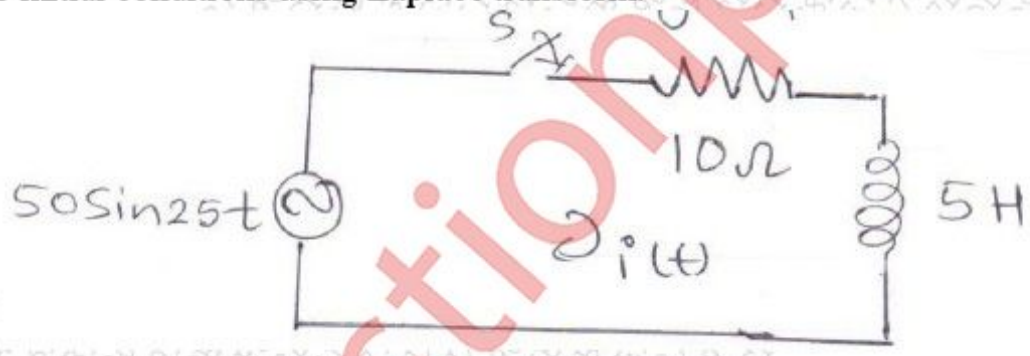
N.B.: 1) Question number **one** is compulsory.
2) Attempt any **three** questions out of remaining **five** questions.
3) **Figures** to the **right** indicate full marks.
4) Assume suitable data if required.
5) Use Smith chart for transmission line problem

1. a) Find poles and zeros of the impedance of the following network. 5)

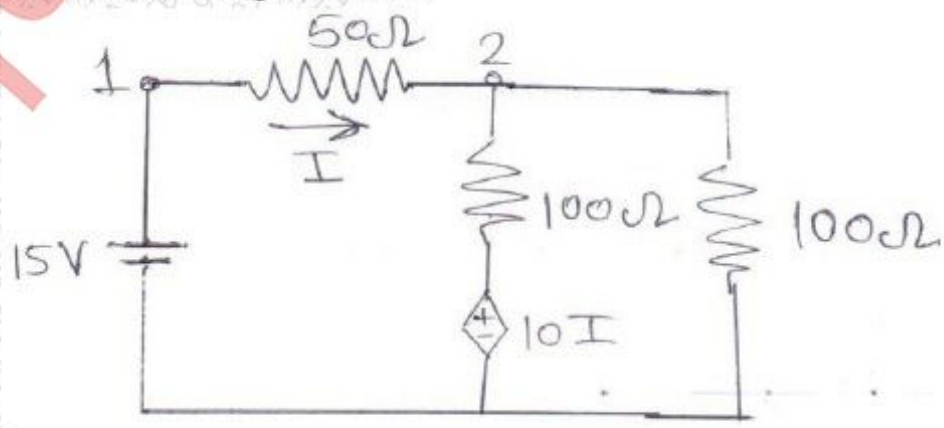


b) What are standing waves? Define reflection coefficient and VSWR of a transmission line. 5)
c) Explain various types of filters in circuit theory. 5)
d) Explain the graphical representation of series resonance circuit. 5)

2. a) For the network shown determine the current i (t) when the switch s is closed at t=0 with zero initial conditions using Laplace transform. 10)



b) The impedance parameters of two port network are $Z_{11} = 6\Omega$, $Z_{22} = 4\ \Omega$, $Z_{12} = Z_{21} = 3\ \Omega$. Compute the Y parameters. 5)
c) Find the voltage at node 2 for the figure shown. 5)



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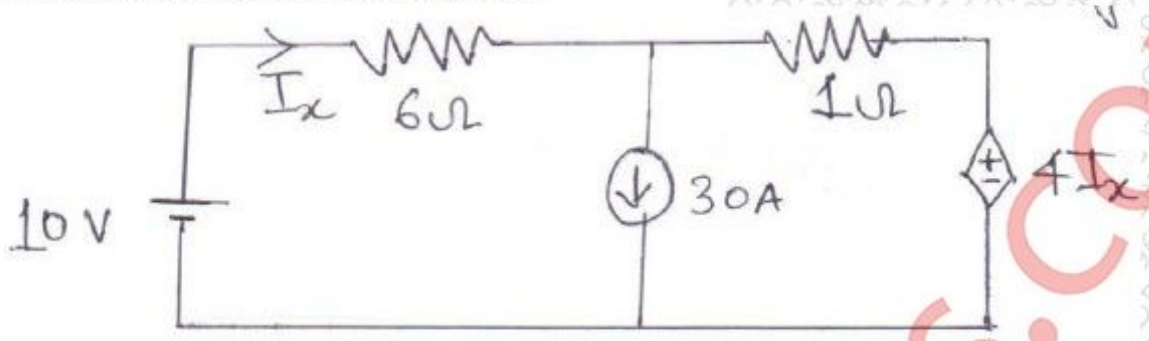
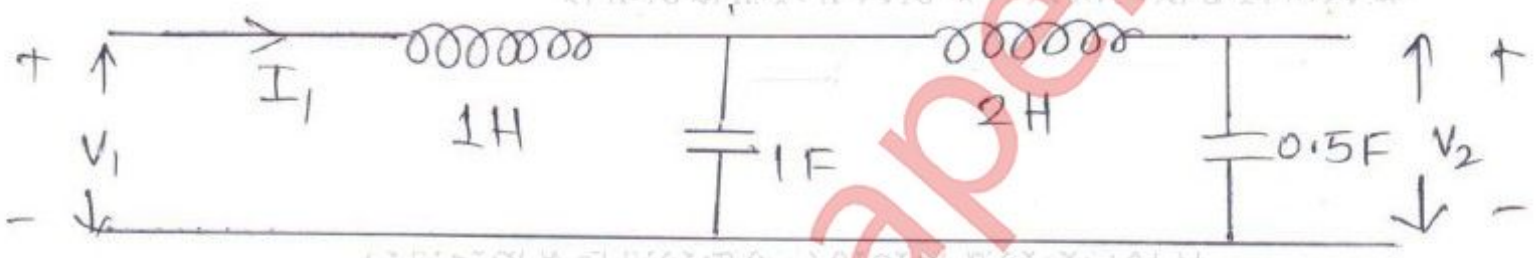
3. a) Design a short circuit shunt stub match for Z_L=150 -200j (Ω) for a line of Z_0=100 Ω and Frequency at f = 20 MHz using Smith chart. 10)

b) Find the current I_x using superposition theorem. 5)



c) Determine $\frac{V_1}{I_1}$ and $\frac{V_2}{I_1}$ for the given network. 5)



4. a) Test whether following functions are a positive real function . 10)

i) $F1(s) = \frac{s^2 + 1}{s^3 + 4s}$

ii) $F2(s) = \frac{2s^3 + 2s^2 + 3s + 2}{s^2 + 1}$

b) Use continued fraction expansion method to check whether the given polynomials is Hurwitz or not. 5)

$$P(s) = s^7+2s^6+2s^5+s^4+4s^3+8s^2+8s+4$$

c) Realize Caur first form of the following L C impedance function. 5)

$$Z(s) = \frac{10s4 + 12s^2 + 2}{2s3 + 2s}$$

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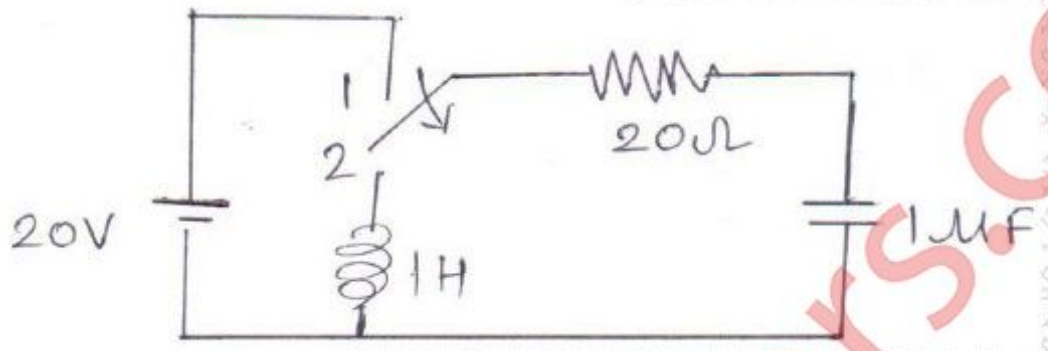
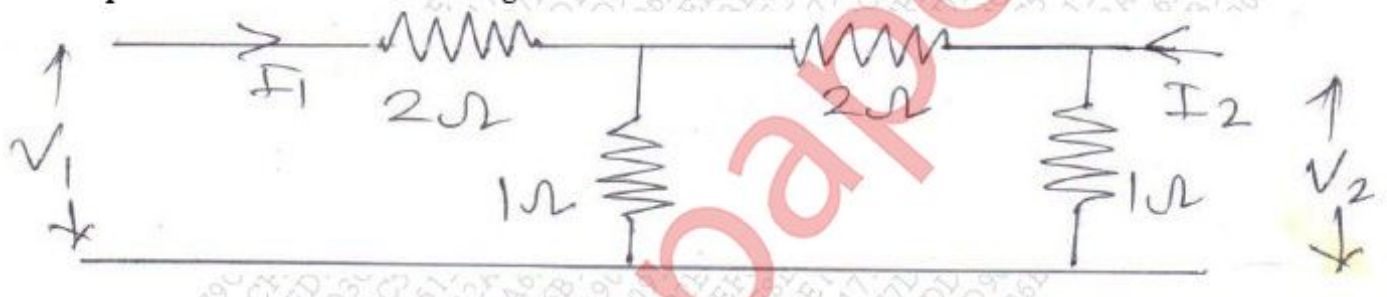
5. a) In the network shown, the switch is changed from position 1 to position 2 at t=0. 10)

Steady state condition having reached before switching. Find the value of i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t=0^+$



b) Determine h parameters of the network given. 5)



c) The constants of a transmission line are R= 6 Ω /Km, L=2.2 mH /km, G=0.25 x 10^{-6} mho /km, C = 0.005 μF/km. Determine the characteristic impedance and propagation constant of the Line at a frequency of 1 k Hz. 5)

6. a) Design an m- derived T- section high pass filter with a cut off frequency of 2KHz . 5)
Design impedance of 700Ω and m =0.6.

b) What are scattering parameters. State their properties. 5)

c) Explain characteristics and applications of Smith chart. 5)

d) List the types of damping in a series R-L-C circuit and mention the condition for each damping. 5)